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ABSTRACT

This paper investigates what types of instruction-feedback combinations may contribute to the learning of English grammar for 120 Japanese university students. Students were given tests on grammaticality judgment and correction, using English ergative verbs in three trials of a post-instruction test. Subjects were divided into six groups according to type of instruction and feedback they received. Overall findings indicate that students with output instruction plus explicit metalinguistic information outperformed Post-test 1 over those with output instruction and no feedback. In the grammaticality judgment test, the effect of input instruction held over 1 week (post-test 2), but output instruction had only an immediate (post-test 1) influence on the formulations of grammatical knowledge. Finally, input instruction combined with either explicit metalinguistic information or positive evidence was not found to have significantly more gains in grammatical knowledge than output instruction. Educators should keep in mind that providing explicit metalinguistic information is a very effective way of altering grammatical knowledge of learners when they are engaged in output and that the effect of treatment may continue longer for input instruction than for output instruction. The test is appended. (Contains 18 references.) (Author/NAV)

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The effects of instruction plus feedback on Japanese university students of EFL : a pilot study

Mikio Kubota

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The effects of instruction plus feedback on Japanese university students of EFL: a pilot study

Mikio Kubota

Abstract

The main purpose of the current classroom research is to investigate what types of instruction-feedback combinations may contribute to the learning of grammar. The following two Research Questions are thus addressed:

Research Question (1)——What type of instruction combined with what type of feedback will have an effect on the formulation of grammatical knowledge?

Research Question (2)——If there is an effect for treatment, will the effect hold over the three post-test sessions for learners receiving input instruction and output instruction?

A total of 120 Japanese university students of EFL (English as a Foreign Language) participated in the whole investigation. They were given two kinds of tests (grammaticality judgment test and correction test) on English ergative verbs in Post-tests 1 (immediately), 2 (one week after treatment), and 3 (one month after treatment). All the subjects were divided into 6 groups (4 experimental groups and 2 control groups), according to the type of treatment (instruction+feedback) they received:

Group A1 : input instruction + explicit metalinguistic information
Group A2 : input instruction + positive evidence
Group B1 : output instruction + explicit metalinguistic information
Group B2 : output instruction + positive evidence
Group C1 : input instruction + no feedback
Group C2 : output instruction + no feedback

The overall findings resulting from Tests (A) and (B) in this research demonstrate that :
(1) Group B1 outperformed Group C2 in Post-test 1, (2) In the grammaticality judgment test the effect of input instruction held over one week, but output instruction had only an immediate influence on the formulations of grammatical knowledge, (3) input instruction combined with either explicit metalinguistic information or positive evidence was not found to have significantly more gains in grammatical knowledge than output instruction.

The pedagogical implications are that teachers should keep in mind that providing explicit metalinguistic information is a very effective way of altering grammatical knowledge of learners when they are engaged in output, and that the effect of treatment may continue longer for input instruction than for output instruction.

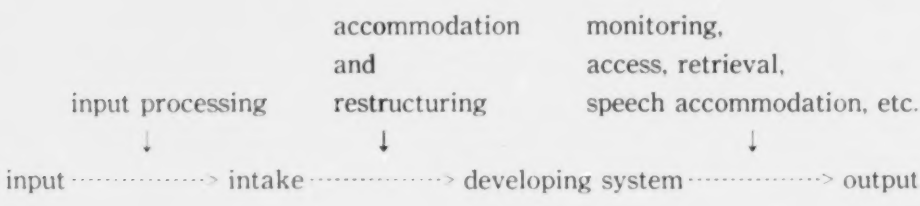
Keywords
input processing, processing instruction, positive feedback, negative feedback, metalinguistic information

1. Introduction

Communication-oriented approaches to ESL/EFL classrooms have become increasingly popular. One can see the swing of the pendulum with regard to the importance of grammar teaching. It

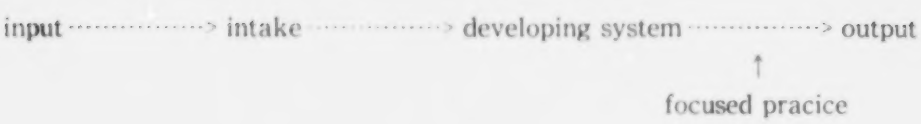
seems that recent trends re-emphasize grammar teaching and vocabulary teaching. VanPatten (1993 : 436) sketched a model of second language acquisition and use, as shown in Figure 1. Three sets of processes were described. The first process, called 'input processing,' involves the conversion of input to intake, which is referred to as the subset of input that is comprehended and attended to in some way. Input is required as "raw data" for acquisition, and input processing is the first step in getting relevant data to the developing system in some way. The second set of processes are accommodation and restructuring that mediate the incorporation of intake into the developing system. The third set — monitoring, access, retrieval, speech accommodation (modifying one's speech for a particular interlocutor), etc.— involves making use of the developing system to create output.

Figure 1 : A model of second language acquisition and use



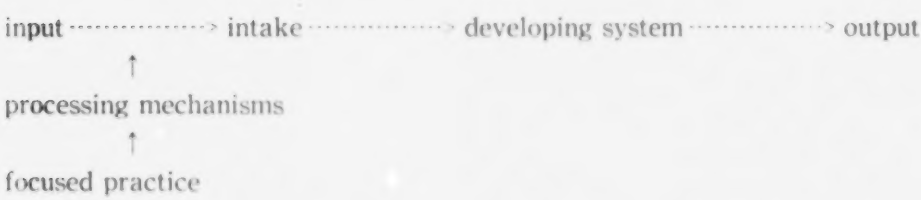
Traditional approaches to explicit grammar instruction may contain grammatical explanations followed by output practices, which actually work on processes involved in accessing the developing system, as illustrated in Figure 2. The learner is asked to produce when the developing system has not yet had the relevant intake data (VanPatten 1993 : 436).

Figure 2 : Traditional grammar instruction



Input-based approaches to explicit grammar instruction may involve consciousness-raising activities where the instruction is aimed at developing explicit rather than implicit knowledge. The learners are not expected to produce the target structure, only to understand it by formulating some kind of cognitive representation of how it works (Ellis 1994 : 643). VanPatten (1993 : 438) proposed 'processing instruction,' whose purpose is to direct learners' attention to relevant features of grammar in the input and to encourage correct form-meaning mappings that in turn result in better intake, as shown in Figure 3. The input is purposefully prepared, manipulated, or structured in the sense that it is not free-flowing and spontaneous unlike the input involved in communicative interactions. In the same sense, Ellis (1995 : 88) used 'interpretation tasks,' a comprehension-based approach to grammar teaching.

Figure 3 : Input-based grammar instruction



Input-based grammar instruction involves grammatical explanations like traditional instruction ; unlike traditional instruction, it focuses practice on correctly intepreting incoming utterances and on perceiving and processing those elements in the input that

might otherwise be missed, and input-based grammar instruction also centers on activities involving structured input (VanPatten 1993 : 438).

VanPatten (1993 : 437) described two processing stragegies for second language input processing.

(1) a word order strategy :

It seems that both first and second language learners universally tend to process the preverbal N or NP as the subject (agent) of the verb (action) and the postverbal N or NP as the object.

(2) a learner's attention on content words and elements of high communicative value :

Learners attend to meaning before anything else and as a consequence, they prefer to attend to lexical items for semantic information rather than grammatical markers that encode the same information.

Following are the guidelines that input-based grammar instruction is based on (VanPatten 1993 : 438-439) :

1. Teach only one thing at a time.
2. Keep meaning in focus.

The learner should not be able to successfully complete the activity unless he/she has understood the content of each utterance.

3. Learners must "do something" with the input.

e.g., checking boxes, surveying, answering True/False questions, making one-word response, making a multiple-choice, writing a person's or object's name.

4. Use both oral and written input.

A judicious combination of oral and written structured input provides for the widest net possible in directing learners' attention.

5. Move from sentences to connected discourse.

Connected discourse should come later in a lesson rather than at the beginning, because it may (a) not allow sufficient process-

ing time, or (b) result in noise. By starting with sentences, learners have better opportunities to perceive and process the grammatical item in focus.

6. Keep the psycholinguistic processing mechanisms in mind.

Learners' focal attention during processing is directed toward the relevant grammatical items and not elsewhere in the sentence.

The first research of processing instruction was conducted by VanPatten and Cadierno (1993a). They examined Spanish direct object pronouns in three second-year university level classes.

Traditional grammar instruction group (n=15) :

presentations and explanations of direct object pronouns → mechanical to meaningful to communicative exercises in which producing sentences was the focus.

Processing instruction group (n=17) :

presentations, and explanations of object pronouns that included a cautionary note not to rely on word order to understand sentences → structured input activities that involved interpreting and responding to input. (N.B. : no production activities were involved)

Control group (n=17) :

no explicit instruction received.

The Pre-test and three Post-tests, using a split-block design, were given to the subjects as the means of assessing the effect of instruction. All tests consisted of both interpretation tasks and written production tasks. The comprehension task for all tests consisted of 15 aural sentences, and asked the subjects to match each sentence they heard with one of two pictures. The production task, including 5 items, asked the subjects to complete a sentence according to visual clues.

The results of ANOVA and post-hoc Scheffé tests show :

(1) the processing group did significantly better than the traditional group and the control group on the raw scores of the

interpretation task, and the processing group outperformed the traditional and control groups on the gain scores in the three Post-tests of the interpretation task.

(2) the traditional group was not superior to the processing group but rather to the control group on the raw scores of the production task, and the processing group did significanltly better than the control group on the gain scores in Post-tests 1 and 3 of the production task.

Thus, it can be stated that processing instruction had an impact on the developing system and what the subjects could access for production, whereas traditional instruction had an effect on what the subjects could access for production, but it had little impact on the developing system.

VanPatten and Cadierno (1993b) replicated VanPatten and Cadierno (1993a), including more subjects per experimental cell. The acquisition of Spanish syntactic items (direct object pronouns) by second-level university students learning Spanish as a Foreign Language in America was investigated. There were three groups compared :

Traditional grammar instruction group (n=26) :
presentations and explanations of direct object pronouns → mechanical to meaningful to communicative exercises in which producing sentences was requested.

Processing instruction group (n=27) :
presentations, and explanations of object pronouns that included a cautionary note not to rely on word order to understand sentences → structured input activities that involved interpreting and responding to input. (N.B. : no production activities were involved)

Control group (n=27) :
no explicit instruction received.

The differences between the two experimental groups were that (a) the processing group was told that language learners often

misinterpret NVN sequences, and (b) the traditional group did not practice interpreting sentences, and the processing group did not practice producing sentences.

A sentence-level aural comprehension test and a sentence-level written production test were given to the subjects in the Pre-test and three Post-tests, where a split block design was used. The Pre-test was used to eliminate subjects from the study who had already demonstrated correct interpretation of object pronouns and the ability to correctly produce object pronouns in a sentence. The comprehension test, which was biased toward the processing group, included interpreting 10 sentences with preverbal object pronouns and postverbal subject pronouns, via pictures. The production test, which was biased toward the traditional group, asked the subjects to complete five sentences based on visual representations. Thus, the test was considered balanced.

The results of ANOVA and post-hoc Scheffé tests demonstrated:

(1) the processing group scored significantly better than the control group on the raw scores of both the comprehension and production tasks.

(2) the traditional group significantly outperformed the control group only on the raw scores of the production task.

These results imply that processing instruction and the structured input had an effect on how learners process input, and thus caused a change in the developing system, and had an effect on production, while the traditional instruction resulted in some sort of learned language knowledge that did not make its way into the developing system and was not tapped for acquisition during comprehension. Therefore, these results parallel those in VanPatten and Cadierno (1993a).

The third study of processing instruction was made by Cadierno (1992/1995). She replicated VanPatten and Cadierno (1993a, 1993b), only changing the linguistic items under study, where the

past tense verb morphology in Spanish was targeted for a total of 61 university students enrolled in 9 classes of a third-semester basic Spanish course. The same patterns of the effects of instruction were obtained in her study as well : processing instruction had a significant effect on how learners perceive and produce past tense forms in Spanish, while traditional instruction had an effect only on production of past tense forms. Cadierno (1995 : 189-190) pointed out several methodological objections against her study : (1) similarity of the interpretation task to some of the activities in the processing instructional treatment, (2) obscuring possible qualitative differences on the production task, (3) no measure of spontaneous production included in the study, (4) no post-test that covered more than one month after the instructional treatment, (5) variation of activity types—i.e., the activities in processing instruction were mostly meaningful and communicative, whereas traditional instruction included not only mechanical, but also more meaningful and communicative activities, and (6) only one linguistic item investigated in the study.

The result common to these three studies (VanPatten and Cadierno 1993a, 1993b ; Cadierno 1992/1995) demonstrate that processing instruction seems to be more effective than traditional instruction in the case of Spanish linguistic items. This result does not advocate the elimination of output practice in FL teaching, as Cadierno (1995 : 190) mentioned. Cadierno (1995 : 191) suggested that explicit instruction should involve a move from an input-based approach that seeks to make changes in the developing system to an output-based approach that contains the provision of opportunities for output practices in order to develop learners' abilities in accessing their developing system for fluent production. Furthermore, the desirability of having a combined form-meaning focused instruction was suggested in Cadierno (1995 : 191). This was in line with Long's (1991 : 45-46) "focus on form" approach where "the students' attention is drawn to linguistic

elements as they arise incidentally in lessons whose overriding focus is on meaning and communication" (Cadierno 1995 : 191), as opposed to a "focus on forms" approach where "instruction seeks to isolate linguistic forms in order to teach and test them one at a time" (Ellis 1994 : 639) as in regular grammar lessons.

Sanz (1993) suggested that processing instruction translates into improved performance in less controlled communicative tasks. Learners asked to narrate short video clips after receiving processing instruction in object pronouns demonstrated a marked improvement in their ability to use object pronouns in connected discourse that was not sentence focused and was "less controlled" by the experimenter.

Tuz (1994) compared comprehension-based instruction with production-based instruction by using three groups of Japanese junior college students of EFL with regard to psychological verbs (e.g., *frighten, amuse*). The comprehension-based instruction (Group C) and production-based instruction (Group P) started equally at the presentation stage. The teacher spoke aloud the correct sentence corresponding to what was represented by each picuture while the subjects looked at pictures and listened. At the exercise stage, in the comprehension-based instruction, the subjects were first asked to match the picture with the sentence repeated by the teacher, and they were given correct answers on the OHP after each sentence. Second, they were required to match written sentences with pictures, and were corrected by the teacher after the task. The final exercise was a grammaticality judgment task. The answers were then corrected. On the contrary, in the production-based instruction the subjects were asked to chorally produce the utterance corresponding to each picture. They were corrected by the teacher as a group after each attempt. The next exercise requested the subjects to write a sentence about the picture (answer : *Sometimes* _____), using the present tense verb given by the teacher. The final

exercise involved filling in the blank with the correct noun. The correct answers were provided by the teacher. The control group worked on unrelated reading assignments before the post-tests. The results showed that students receiving a comprehension-based instructional treatment outperformed students receiving a production-based instructional treatment on both a comprehension test and a production test. However, it was pointed out that these results should be viewed as essentially inconclusive, because of the limited length of both the comprehension and production tests and no post-tests given to examine the long-term effects of instruction.

To develop fluency and to increase accuracy during access, learners must have some opportunity to use the language to express messages (VanPatten 1993 : 447). VanPatten (1993 : 447) proposed "structured output" where there is a clear focus on conveying meaning but where the output is structured by the task at hand. Following are the guidelines of structured output activities :

1. Teach only one thing at a time.
2. Keep meaning in focus.
3. Someone must "respond" to the learners' output.
4. Use both oral and written output.
5. Move from sentences to connected discourse.

To the best of the present researcher's knowledge, there has been only one study on input instruction in EFL situations, especially in Japan (Tuz 1994), so that this study will be a pioneer work.

2. The Study

In this research, I will examine which types of instruction plus which types of feedback may be effective in enabling learners to formulate their own grammar.

2.1. Procedures

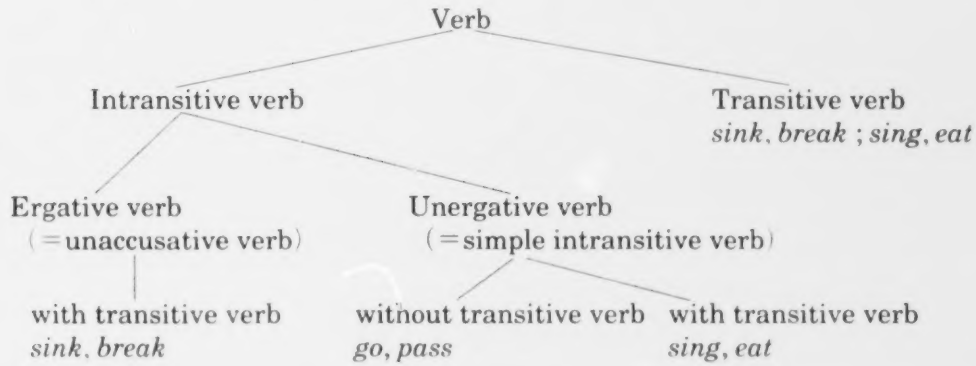
2.1.1. Subjects

120 university students (6 classes) of EFL in Japan participated in the whole study. They had studied English only in foreign language classroom situations. The present researcher served as a teacher in the experiment. The data of 39 students had to be excluded from the analysis, since they missed one or more of the following : the Pre-test, the treatment, and Post-tests 1, 2, 3.

2.1.2. Test Items

Ergative verbs were targeted in this research. Ergative verbs (e.g., Burzio 1981, Keyser and Roeper 1984) refer to unaccusative verbs, which denote processes lacking volitional control (Perlmutter 1978). Perlmutter (1978) made a distinction between simple intransitive verbs, which imply volitional control, and unaccusative verbs, which do not. The operational definition of ergative verbs in this research is that the object of the transitive use is the subject of the intransitive use (*Collins COBUILD Student's Grammar* 1991 : 152). As the following Figure 4 shows, verbs are classified as transitive and intransitive verbs. Intransitive verbs are divided into ergative verbs and unergative verbs. Ergative verbs are with a transitive counterpart. It should be noted that Yip (1994 : 127) subcategorized ergative verbs into ergatives with a transitive counterpart and without it (e.g., *happen, arrive*), but this analysis is not taken into consideration in this research because of the operational definition mentioned above.

Figure 4 : Classification of verbs



For example,

1. a. John *sang* a song. [transitive]
   b. The birds *sang* in the trees. [intransitive, unergative]
2. a. A gale *sank* the boat. [transitive]
   b. The ship *sank* slowly. [intransitive, ergative with transitive counterpart]

2.2. Research Design

The current experiment had five stages : the Pre-test session, the Treatment session, and three Post-test sessions.

[Stage 1 : Pre-test session]

The Pre-test, which was 15 minutes long, was given to all the subjects (see Appendix). It required the subjects to find and correct errors while reading the passages. In No.1 there were 3 ergative verbs checked (*start, stop, spill*), which included 2 grammatical errors, while No.2 contained 5 ergatives checked (*miss, shake, break, hurt, stop*), 4 of which had grammatical errors.

[Stage 2 : Treatment session]

The 6 classes were randomly assigned to the following groups according to the type of feedback the subjects received. In each class, 20 subjects were chosen randomly. Groups A1, A2, B1, and B2 were the experimental groups, whereas Groups C1 and C2 served as the control groups. The treatment session contained both the instruction session and the feedback session. The instruction session of each group lasted 10 minutes, and the feedback session of experimental groups was 5 minutes long in groups receiving explicit metalinguistic information and 2 minutes long in Groups receiving positive evidence.

Treatment = [Instruction session] + [Feedback session]			
session			
Group A1 (n=20)	input instruction	+	explicit metalinguistic information
Group A2 (n=20)	input instruction	+	positive evidence
Group B1 (n=20)	output instruction	+	explicit metalinguistic information
Group B2 (n=20)	output instruction	+	positive evidence
Group C1 (n=20)	input instruction	+	no feedback
Group C2 (n=20)	output instruction	+	no feedback

Instruction session

All the groups received either input instruction or output instruction in this research.[1] There were 2 treatments provided for each instruction (see Appendix). In Treatment 1 for input instruction, the subjects were asked to respond to the informational content of the input by choosing the appropriate picture

that matched the sentence. The meanings were in focus for input instruction. The following sentences were read by the present researcher :

(1) The woman died in the bed yesterday.
(2) The glass was broken when the boy knocked it.
(3) The alarm clock is ringing suddenly now.
(4) The ship is sinking in the ocean now.
(5) The shirt dried off very quickly in the sun.

By contrast, in Treatment 1 for output instruction, the subjects were requested to complete the sentences using the same ergative verbs as in input instruction. They were engaged in mechanical drills where meanings were not always the focus.

In Treatment 2 for input instruction, the subjects chose the appropriate sentence in the context given, while in Treatment 2 for output instruction the subjects were asked to translate Japanese into English, using the ergative verbs given.

Feedback session

After the instruction session ended, feedback was provided to each experimental group, though no feedback was given to the control groups (C1, C2).

Explicit metalinguistic information was given to Groups A1 and B1. This functioned as positive and negative feedback. The subjects received the following explicit grammatical explanations including sentences of Nos. 2, 3, 5 in Treatment 1 :

The following sentences were written on the blackboard.

(2) a. The glass broke when it fell.
a'.*The glass was broken when it fell.
b. The glass was broken when the boy knocked it.
b'. The boy broke the glass when he knocked it.
(3) a. The alarm clock is ringing suddenly now.
a'. The alarm clock is being rung suddenly now.
b. The man is ringing the alarm clock suddenly now.

(5) a. The shirt dried off very quickly in the sun.
a'. The shirt was dried off very quickly in the sun.
b. The woman dried off the shirt very quickly in the sun.

The subjects in Groups A1 and B1 were given explicit grammatical explanations as follows:

The grammatical subject of (2a), (3a), (5a) is not the logical subject (i.e., the agent), but rather the logical object (i.e., the theme). The object of the transitive use (2b', 3b, 5b) is the subject of the intransitive use (2a, 3a, 5a). Sentence (2a') was not grammatical. The passivized construction was not allowed in the context given where the falling of the glass caused it to break. In Group A1 Sentences (2a), (2b), (3a), (3b), (5a), (5b) matched Pictures (2a), (2b), (3a), (3b), (5a), (5b), respectively; in Group B1 Sentences (2b), (3a), (5a) matched Pictures (2), (3), (5), respectively.

For Groups A2 and B2, exposure to positive evidence existed, that is, three grammatically correct sentences were presented in Treatment 1 (Nos. 2, 3, 5). They were written on the blackboard, and were read by the teacher. No treatment was provided for Groups C1 and C2.

After treatment, all the subjects were told not to study the target structure voluntarily.

[Stage 3: Post-test 1]

The Post-test 1 was administered immediately upon the completion of treatment (see Appendix). The Post-test 1, which was 10 minutes long, included Test (A) and Test (B). Test (A) asked the subjects to make a grammaticality judgment about ergative verbs; Test (B), the correction test, required the subjects to correct the verbs assigned in each sentence. Both Tests (A) and (B) were designed to elicit the receptive knowledge of learners.

[Stage 4 : Post-test 2]

One week after treatment, the 10-minute Post-test 2 was given. It was the same test as the Post-test 1.

[Stage 5 : Post-test 3]

One month after treatment, all the subjects were given the 10-minute Post-test 3, the same as the Post-test 1 or 2.

After the Post-test 3, all the subjects reported that they did not study the target structure for themselves outside of classrooms or receive any instruction in other classes during the investigation.

2.3. Scoring procedures

Raw scores were calculated for use in the statistical analyses. Regarding the Pre-test, each correct response to 6 test items that needed to be corrected was given a score of one point. No response to 2 items that should not be corrected was given one point respectively. Incorrect response received a score of zero. Hence, the Pre-test was worth 8 points.

Both Test (A) and Test (B) in the Post-test were worth 9 points. One test item that served as a distractor in each test was not counted for statistical analyses.

2.4. Data Analysis

The rejection level was set at an $\alpha = .05$ level of statistical significance, for most analyses. A two-way analysis of varience (ANOVA) with repeated-measures design and a one-way ANOVA were employed to analyze the means among the groups and sessions.

2.5. Research Question

The main purpose of this research is to investigate what types of instruction-feedback combinations may contribute to the learning of grammar. The following two Research Questions are thus

addressed in this research:

Research Question (1)——What type of instruction combined with what type of feedback will have an effect on the formulation of grammatical knowledge?

Research Question (2)——If there is an effect for treatment, will the effect hold over the three post-test sesseions (i.e., immediate, one week later, one month later) for learners receiving input instruction and output instruction?

2.6. Hypotheses

Hypothesis 1 is concerned with Research Question (1), while Hypotheses 2-3 are related to Research Question (2).

H1 : There would be no statistically significant difference in accuracy of responses between the experimental groups (A1, A2, B1, B2) and the control groups (C1, C2).

That is, the test scores would result in no significant difference between the experimental groups and the control groups.

H2 : There would be no statistically significant difference in accuracy of responses among sessions in the experimental groups and the control groups.

This is also a null hypothesis, since no theory or previous research explains the difference. The following alternative hypothesis will be tested in case the null hypothesis is rejected.

H3 : The experimental groups would respond significantly better in Post-test 1 than in Post-tests 2 and 3.

It is assumed that a positive learning effect would exist at least immediately, owing to the provision of the treatment.

3. Results

3.1. Pre-test

The Pre-test was worth 8 points. Table 1 shows the means and standard deviations by group. Table 2 displays the results of the one-way ANOVA in the Pre-test. The results indicate that group differences were not statistically significant in the Pre-test ($F_{(5,114)}=0.42$, ns). Accordingly, any comparative effects due to treatment were not related to prior knowledge or language ability of any one group. The possibility that the subjects had been previously exposed to instruction on ergative verbs did not constitute a confounding variable in this investigation.

In addition, the sufficiently low scores on the Pre-test revealed that there was room for improvement that would take place after treatment.

Table 1 : Means and standard deviations by group in the Pre-test

Group	n	Mean	SD
Pre-test			
A1	20	3.10	0.70
A2	20	3.30	0.64
B1	20	3.10	0.44
B2	20	3.40	0.66
C1	20	3.55	1.02
C2	20	3.80	1.03

Table 2 : Results of one-way ANOVA in the Pre-test

	SS	df	MS	F	p
Groups	7.97	5	1.59	0.42	ns
Residual	3.78	114	3.78		

$F_{critical(5,114)}=2.29$

3.2. Test (A) in Post-tests

Test (A) was worth 9 points. Table 3 shows the means and

standard deviations by group and session. The means of correct responses are depicted in Figure 5.

Table 4 shows the results of two-way repeated-measures ANOVA in Test (A). The results indicate that group differences were not statistically significant, but session differences ($F_{(2,228)}=11.74$, $p<.05$) and the group by session interaction ($F_{(10,228)}=1.68$, $p<.10$) were significant. Hence, the simple main effects were tested to determine which levels influenced the results.

Table 3: Means and standard deviations by group and session in Test (A)

Group	n	Mean	SD
Post-test 1			
A1	20	5.10	1.18
A2	20	4.55	0.92
B1	20	5.40	1.80
B2	20	4.65	1.42
C1	20	4.65	1.65
C2	20	4.00	2.02
Post-test 2			
A1	20	4.70	1.19
A2	20	4.25	1.95
B1	20	4.65	1.59
B2	20	4.00	1.82
C1	20	4.35	1.24
C2	20	4.55	2.01
Post-test 3			
A1	20	4.35	1.11
A2	20	3.90	1.89
B1	20	4.35	1.24
B2	20	3.60	1.71
C1	20	4.50	1.66
C2	20	4.05	2.18

Figure 5 : Means of correct responses in Test (A)

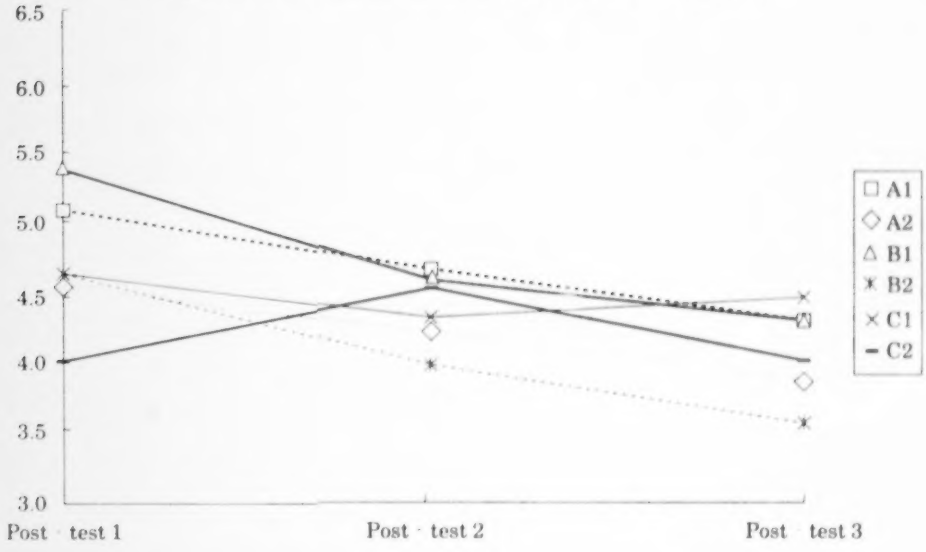


Table 4 : Results of two-way repeated-measures ANOVA in Test (A)

Source	S	df	MS	F	p
Between subjects	699.82	119			
Groups	26.12	5	5.22	0.88	ns
Subjects within groups	673.70	114	5.91		
Within subjects	248.00	240			
Session	21.60	2	10.80	11.74	$<.05$
Groups by session	15.53	10	1.55	1.68	$<.10$
Residual	210.87	228	0.92		

$F_{critical(5,114)} = 2.29$ $(p<.05)$
$F_{critical(2,228)} = 3.07$ $(p<.05)$
$F_{critical(10,228)} = 1.91$ $(p<.05)$; 1.65 $(p<.10)$

Table 5 illustrates the analysis of the group by session interaction effect in Test (A). The results show that the differences among groups in Post-test 1 were not significant, as shown in Table 5. However, F value ($F_{(5,114)}=1.85$) was so approximate to the critical value ($F_{critical(5,114)}=1.90$; $p<.10$) that it may be not incorrect to claim that there existed a trend toward statistical

significance. As shown in Table 5, differences of sessions at Groups A1, B1, and B2 were statistically significant, respectively. Additionally, it was found that there was a trend toward statistical significance in sessions at Group A2 ($F_{(2,228)}=2.30$; $F_{critical(2,228)}=2.35$, $p<.10$).

Table 5: Analysis of the group by session interaction efffect in Test (A)

	SS	df	MS	F	p
Groups at Post-test 1	23.20	5	4.64	1.85	ns
Subjects × Groups at Post-test 1	286.01	114	2.51		
Groups at Post-test 2	7.00	5	1.40	0.48	ns
Subjects × Groups at Post-test 2	332.60	114	2.92		
Groups at Post-test 3	11.40	5	2.28	0.78	ns
Subjects × Groups at Post-test 3	335.40	114	2.94		
Sessions at Group A1	5.63	2	2.82	3.07	<.05
Sessions at Group A2	4.23	2	2.12	2.30	ns
Sessions at Group B1	11.70	2	5.85	6.36	<.01
Sessions at Group B2	11.23	2	5.62	6.11	<.01
Sessions at Group C1	0.90	2	0.45	0.49	ns
Sessions at Group C2	3.70	2	1.85	2.01	ns
Residual	210.87	228	0.92		

$F_{critical(5,114)}=2.29$ ($p<.05$); 1.90 ($p<.10$)
$F_{critical(2,228)}=4.79$ ($p<.01$); 3.07 ($p<.05$); 2.35 ($p<.10$)

Multiple comparisons of simple main effects were made to determine which levels were different from each other, using the LSD method. The results of between-group comparisons of means in Post-test of Test (A) are shown in Table 6, while Table 7 displays the results of between-session comparisons of means in Test (A). As shown in Table 6, Groups A1 and B1 were significantly different from Group C2 ($p<.10$), in Post-test 1. Therefore, it is concluded that the null hypothesis (H1) was rejected in that treatments provided to Groups A1 (input instruction+metalin-

guistic information) and B1 (output instruction+metalingusitic information) were more effective than C2 (output instruction+no feedback), at least immediately in Post-test 1.

Table 6 : Between-group comparisons of means in Post-test 1 of Test (A)

Mean	Group	C2	A2	C1	B2	A1
4.00	C2					
4.55	A2					
4.65	C1					
4.65	B2					
5.10	A1	**				
5.40	B1	**				

** $p<.10$

As illustrated in Table 7, Post-test 1 was significantly different ($p<.05$) from Post-test 3 in Group A1. That is, the effects of treatment for Group A1 continued over one week. In Group A2, Post-test 1 differed from Post-test 3 ($p<.10$); therefore, the effects of treatment for Group A2 also lasted over one week. Moreover, in Groups B1 and B2 Post-test 1 was significantly different ($p<.05$) from Post-tests 2 and 3 : Groups B1 and B2 had only an immediate impact on the learning of grammatical knowledge.

Accordingly, the null hypothesis (H2) was not supported, and H3 was partially upheld in that there existed statistically significant differences among sessions in Groups A1, A2, B1, and B2.

Table 7 : Between-session comparisons of means in Test (A)

Mean	Session	Post-test 3	Post-test 2
Group A1			
4.35	Post-test 3		
4.70	Post-test 2		
5.10	Post-test 1	*	
Group A2			
3.90	Post-test 3		
4.25	Post-test 2		
4.55	Post-test 1	**	
Group B1			
4.35	Post-test 3		
4.65	Post-test 2		
5.40	Post-test 1	*	*
Group B2			
3.60	Post-test 3		
4.00	Post-test 2		
4.65	Post-test 1	*	*

* $p<.05$; ** $p<.10$

3.3. Test (B) in Post-tests

The full mark of items in Test (B) was 9 points. Table 8 shows the means and standard deviations by group and session. The means of correct responses are illustrated in Figure 6. Table 9 displays the results of the two-way repeated-measures ANOVA in Test (B). As shown in Table 9, both group differences and session difference were significant, although the group by session interaction effect was not observed. Hence, the main effects for the groups and for the sessions were observed. This implied that the groups and sessions influenced the results independently.

Table 8 : Means and standard deviations by group and session in Test (B)

Group	n	Mean	SD
Post-test 1			
A1	20	5.20	1.47
A2	20	4.90	1.61
B1	20	6.35	1.59
B2	20	5.95	1.28
C1	20	5.30	1.42
C2	20	5.30	2.08
Post-test 2			
A1	20	4.95	1.47
A2	20	4.20	1.81
B1	20	6.20	1.72
B2	20	5.45	1.36
C1	20	5.30	2.03
C2	20	4.85	2.24
Post-test 3			
A1	20	5.15	1.74
A2	20	4.30	2.10
B1	20	6.50	1.57
B2	20	5.80	1.47
C1	20	4.85	1.71
C2	20	4.60	2.27

Figure 6 : Means of correct responses in Test (B)

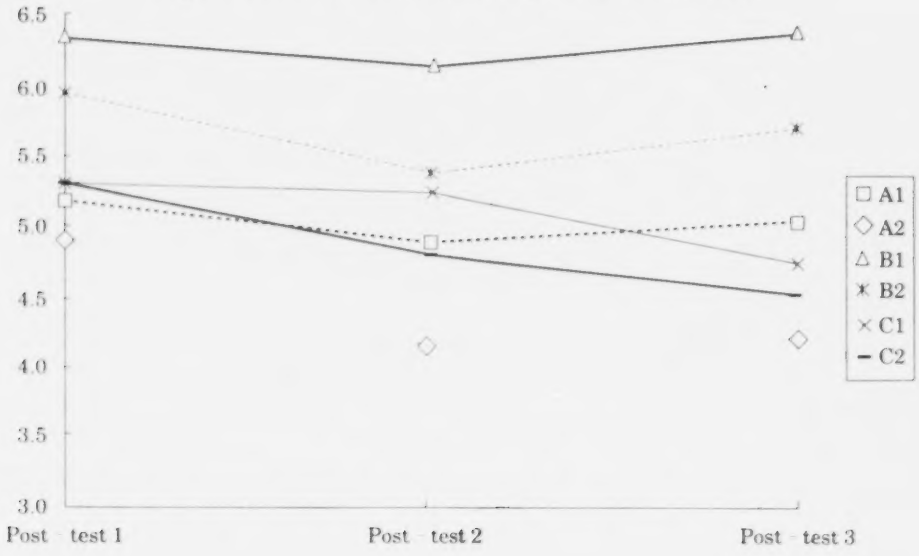


Table 9 : Results of two-way repeated-measures ANOVA in Test (B)

Source	SS	df	MS	F	p
Between subjects	928.20	119			
Groups	131.58	5	26.32	3.77	<.05
Subjects within groups	796.62	114	6.99		
Within subjects	315.33	240			
Session	8.34	2	4.17	3.18	<.05
Groups by session	9.36	10	0.94	0.72	ns
Residual	297.63	228	1.31		

$F_{critical(5,114)} = 2.29$ ($p < .05$)
$F_{critical(2,228)} = 3.07$ ($p < .05$)
$F_{critical(10,228)} = 1.91$ ($p < .05$); 1.65 ($p < .10$)

Multiple comparisons (using the LSD method) of the main effects were made in order to examine which levels were significantly different from each other, since the interaction effects were not obtained. Table 10 shows between-group comparisons of means in Test (B), whereas Table 11 displays between-session comparisons of means. The results show that Group B1 signifi-

cantly outperformed Groups A1, A2, and C2. Group B2 did significantly better than Group A2. In addition, on Test (B) the scores in Post-test 1 were significantly higher than those in Post-tests 2 and 3. Therefore, the null hypotheses (H1 and H2) were not supported, thereby H3 was upheld in that the scores in Post-test 1 were significantly higher than those in Post-tests 2 and 3.

Table 10 : Between-group comparisons of means in Test (B)

Mean	Group	A2	C2	A1	C1	B2
4.47	A2					
4.92	C2					
5.10	A1					
5.15	C1					
5.73	B2	*				
6.35	B1	*	*	*		

* $p<.05$

Table 11 : Between-session comparisons of means in Test (B)

Mean	Session	Post-test 2	Post-test 3
5.16	Post-test 2		
5.20	Post-test 3		
5.50	Post-test 1	*	*

* $p<.05$

4. Discussion

The following three hypotheses were tested in this investigation :

H1 : There would be no statistically significant difference in accuracy of responses between the experimental groups (A1, A2, B1, B2) and the control groups (C1, C2).

H2 : There would be no statistically significant difference in accuracy of responses among sessions in the experimental groups and the control groups.

H3 : The experimental groups would respond significantly better in Post-test 1 than in Post-tests 2 and 3.

The results of Test (A), which was a grammaticality judgment test, revealed that Groups A1 (input instruction+metalinguistic information) and B1 (output instruction+metalinguistic information) outperformed Group C2 (output instruction+no feedback) in Post-test 1, at $p<.10$ level. It was also found that the effects of treatment for Groups A1 and A2 (input instruction+positive evidence) held over the two post-tests (for one week), while Groups B1 and B2 (output instruction+positive evidence) had only an immediate impact on the formulations of grammatical knowledge ($p<.05$).

The results of Test (B), which measured the subjects' grammatical knowledge about ergative verbs by correcting the verbs (the correction test), showed that Group B1 outperformed Groups A1, A2, and C2, and that Group B2 got significantly higher scores than Group A2 ($p<.05$). Additionally, it was revealed that the scores in Post-test 1 were significantly higher than those in Post-tests 2 and 3 ($p<.05$).

In summary, the present investigation gave mixed results: in the grammaticality judgment test, the subjects receiving explicit metalinguistic information benefited more than those receiving output instruction and no feedback at least immediately, while in the correction test output instruction with explicit metalinguistic information was more beneficial than input instruction, or output instruction with no feedback. Output instruction with positive evidence was also found to be more effective than input instruction with positive evidence. The result common to Tests (A) and (B) demonstrated that explicit metalinguistic information was effective in the case of output instruction. This finding suggests that it may be advantageous for teachers to provide learners with explicit metalinguistic information when they are engaged in

production. In addition, it was found that input instruction had a temporary effect (for one week), whereas output instruction had only an immediate impact, in the grammaticality judgment test. In the correction test, the effect of treatment did not continue over one week.

Therefore, these findings in this investigation are partially in accordance with those in VanPatten and Cardierno (1993a, 1993b), Cardierno (1992/1995), and Tuz (1994). Input instruction, which aimed at altering the ways in which input is perceived and processed by learners, was not found to be more effective in enabling learners to alter grammatical knowledge and to reformulate the developing system than output instruction, which manipulated the learners' productions. It was confirmed, however, that the effect of input instruction held longer than output instruction, at least in the grammaticality judgment test. Input instruction combined with either explicit metalinguistic information or positive evidence did not have significant gains in grammatical knowledge.

5. Conclusion

The present investigation gave mixed results, but partially supported the findings obtained by VanPatten and Cadierno (1993a, 1993b), Cadierno (1992/1995), and Tuz (1994). It was not found that input instruction had significantly more gains on the developing system of learners than output instruction, but it was confirmed that output instruction combined with explicit metalinguistic information was more effective than output instruction with no feedback. The result also revealed that the effect of treatment continued longer for input instruction than output instruction at least in the grammaticality judgment test.

This research pedagogically implies that teachers should keep in mind that supplying explicit metalinguistic information is a very effective way of altering grammatical knowledge when

students practice producing target points, and that the effect of treatment may last longer for input instruction than for output instruction.

It should be noted that this classroom research derived from a small-scale study (i.e, a small number of test items analyzed in each test : only 9 items, a problem of True/False format in the grammaticality judgment test : a 50-50 chance of getting correct responses, no test given to elicit controlled and spontaneous productive knowledge of learners, no long-term test that may be given more than one month after treatment), so that it may be improper to make firm conclusions. This research indicates only as a pilot study that was first conducted in EFL situations in Japan.

Further research should investigate other aspects of linguistic structures to elicit both receptive and productive knowledge, and it should examine which will be the most effective methodology—which types of instruction (input, output, or input+output) combined with which types of feedback, with large populations of subjects and test items.

Note

* I would like to thank Sara M. Luna (Lakeland College, WI, USA) for her valuable comments on an earlier version of this research.

1. In this experiment, the terms 'processing instruction' and 'traditional instruction' were not used, since it is not clear whether learners may actually experience input processing in processing instruction, nor whether traditional instruction is really traditional in any type of class. Instead, 'input instruction' and 'output instruction' were used.

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Appendix : TEST

[**Pre-test**] (cf. Ellis 1993 : 75)

Read the following passages. Find and correct errors.

1. It was 6 o'clock in the morning on a rainy day. I came out of the house and was got into my car. It was started easily. As I drove off, a cat rushed out in front of me and I hit it with my front bumper. I braked sharply and fortunately the car stopped before it crashed into a tree. I was jumped out. The cat injured badly, and blood from its head was spilt onto the road. I lifted it carefully and as I held it in my arms, it was closed its eyes and it was died peacefully. I knew that the cat killed accidentally, but I still was felt responsible.

2. It was very windy yesterday. When I came home, I found that the front door was opened. I didn't know why, but at first I thought it was because of the strong wind. When I went upstairs, everything in my room was very untidy. I guessed somebody had been broken into my house. To my shock, 100,000 yen was missing, so I decided to called the police. Suddenly, the whole room was shaken. The vase fell and was broken. My foot was hurt. I realized that the earthquake happened. After 3 minutes, the earthquake was stopped. I relieved but in pain and poorer.

[**Treatment**]

Input instruction

Treatment 1. Look at the following pictures. As you listen to a sentence. decide which picture matches the sentence. Choose a or b.

(1)

a

b

(2)

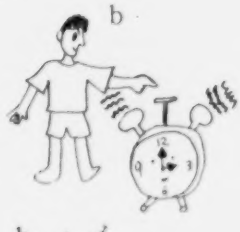
a

b

(3)

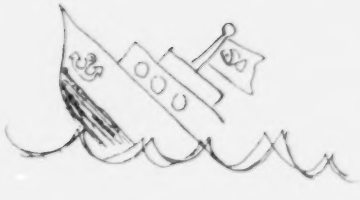
a

b

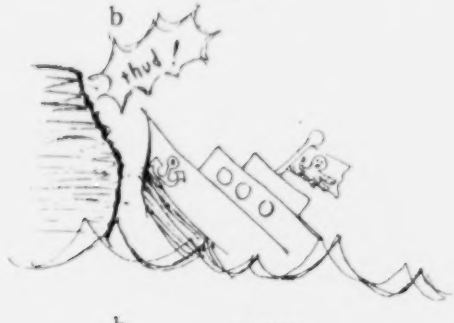


(4)

a



b



(5)

a

b

Treatment 2. Which is the best way of continuing the following sentence? Choose a, b, or c.

(1) The ship was very reliable . . .
   a. It was started easily.
   b. I started it easily.
   c. It started easily.

(2) I was in my study when I began to sense that someone else was present, although I could see nobody.
   a. The book I had just closed opened suddenly.
   b. He suddenly opened the book I had just closed.
   c. The book I had just closed was opened suddenly.

(3) We were in the kitchen eating supper, when something terrible began to happen . . .
   a. The house was shaken violently.
   b. The house shook violently.
   c. We shook the house violently.

(4) I was sleeping well last night. I was supposed to get up at 8 o'clock. But something awoke me at 2 o'clock . . .
   a. An alarm clock was sounded in the night.
   b. I sounded an alarm clock in the night.
   c. An alarm clock sounded in the night.

(5) I am very busy preparing for dinner. When my wife told me to hurry up, I replied as follows . . .
   a. I have already put the meat in the oven. It will roast quite quickly.
   b. I have already put the meat in the oven. The oven will roast it quite quickly.
   c. I have already put the meat in the oven. It will be roasted quite quickly.

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Output instruction

Treatment 1. Complete the following sentences below using the correct form of the verb in the parenthesis, looking at the pictures.

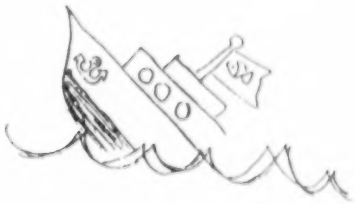
(1) The woman _____ in the bed yesterday. (die)
(2) The glass _____ when the boy knocked it. (break)
(3) The alarm clock _____ suddenly now. (ring)
(4) The ship _____ in the ocean now. (sink)
(5) The shirt _____ off in the sun very quickly yesterday. (dry)

(1)

(2)

(3)

(4)



(5)

Treatment 2. Put the following into English, using the verb in the parenthesis.

(1) その船は，簡単に出航した。(sail)
(2) 私が閉じたばかりの本が，急に開いた。(open)
(3) その家は，激しく揺れた。(shake)
(4) 目覚まし時計が，夜に鳴った。(sound)
(5) その肉はすぐに焼けるでしょう。(roast)

[Answers]
(1) The ship sailed easily.
(2) The book I had just closed opened suddenly.
(3) The house shook violently.
(4) An alarm clock sounded in the night.
(5) The meat will roast quickly.

[Post-test]

Test (A) : Write T if the following sentence is grammatically correct, and write F if it is not grammatically correct.

(1) What was happened here?
(2) Onions cook more quickly than potatoes.
(3) I found that my wallet was missed.
(4) The rain was dropped from the leaves.
(5) The mirror shattered during the earthquake.
(6) The glass broke when it fell.
(7) The number of traffic accidents was increased last year.
(8) A ball bounced over the net.
(9) The house shook violently.
(10) This skirt was washed well.

Test (B) : Complete the following sentences below, using the correct form of the verb in the parenthesis.

(1) When I came home, the front door _____ suddenly because of a strong wind. (open)
(2) His head _____ on the table in the meeting yesterday. (rest)
(3) This book _____ well last year. (sell)
(4) This car _____ very nicely yesterday. (handle)
(5) A woman _____ in the traffic accident yesterday. (kill)
(6) An alarm clock _____ now. (ring)
(7) The eggs _____ now. (boil)
(8) My car _____ into a tree yesterday. (crash)
(9) The last game _____ very quickly yesterday, since it was a no-hitter. (finish)
(10) The shirt _____ off in the sun very quickly yesterday. (dry)